

Fiber Optic Microcantilever Sensor Coupled with Reactive Polymers for Vapor Phase Detection of Ammonia, Phase I

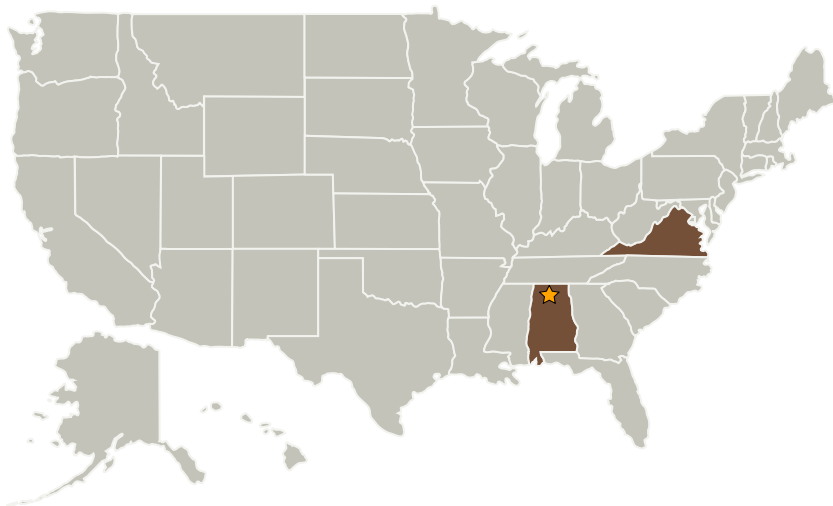
Completed Technology Project (2005 - 2005)



Project Introduction

Luna Innovations proposes to adapt its current aqueous-based, fiber-optic microcantilever sensor technology for real-time, monitoring of ammonia in air. Phase I studies will focus on confirming sensor operation in a vapor-phase detection format and will build upon Luna's current NASA SBIR Phase II program to develop novel affinity microcantilever-based biosensors for monitoring bacterial and chemical contaminants in space-station water supplies. The biosensor is based on the principle that as target organisms or molecules bind to a reactive microcantilever beam, coating deformation caused by the binding event deflects the beam in proportion to the concentration of bound target. Using gold-based coupling chemistries, any assortment of reactive polymers, oligonucleotides, or other suitable ligand can be attached to multiple microcantilever beams in an array format. This allows discrimination of select targets from a complex mixture of other compounds. Using patented interferometric measurement and signal interrogation technology, researchers at Luna have confirmed microcantilever beam deflection with subnanometer sensitivity in water. During the proposed Phase I program, Luna will focus efforts on vapor phase detection of ammonia using novel reactive polymers developed. The microcantilever sensor inherently lends itself to multiplexing using micromachined arrays and can be integrated with virtually any type of air-sampling device.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Luna Innovations, Inc.	Supporting Organization	Industry	Roanoke, Virginia

Primary U.S. Work Locations

Alabama	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Matthew Hull

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.7 Test Instruments and Sensors